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Respectfully Submitted,



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(12) **United States Patent**
Hiroki et al.

(10) **Patent No.:** US 7,279,194 B2
(45) **Date of Patent:** Oct. 9, 2007

(54) **THIN FILM FORMATION APPARATUS AND METHOD OF MANUFACTURING SELF-LIGHT-EMITTING DEVICE USING THIN FILM FORMATION APPARATUS**

(75) **Inventors:** Masaaki Hiroki, Kanagawa (JP); Noriko Shibata, Kanagawa (JP); Shunpei Yamazaki, Tokyo (JP)

(73) **Assignee:** Semiconductor Energy Laboratory Co., Ltd. (JP)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 09/776,472

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B05D 5/06 (2006.01)

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(58) **Field of Classification Search** 427/66, 427/68, 256, 421.1, 422, 427.1
See application file for complete search history.

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(57) **ABSTRACT**

A means of effectively applying an organic EL material application liquid with good application liquid cut-off is provided. A heater and an ultrasonic oscillator are formed in a thin film formation apparatus when applying the application liquid, and heat and ultrasonic oscillations are imparted to the application liquid. Defective application liquid cut-off and liquid clogging can thus be resolved.

34 Claims, 19 Drawing Sheets

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